

c.) Remarks

In the office action of June 6, 2004, claims 1, 5, 6, 12, 14, and 15 have been rejected. Claims 1, 14, and 15 are amended herein. Claims 2-4, 7-11, 13, and 16-17 remain withdrawn from consideration. Claims 18-26, being non-elected claims from an earlier restriction requirement, are canceled as of this response. In this Preliminary Amendment, Claims 1, 14, and 15 are amended and aims 2-4, 7-11, 13, and 16-17 remain withdrawn from consideration. New claims 27 and 28 are added herein. Support for the amendments to Claims 1, 14, and 15 and for new claim 27 and 28 appear at page 7, ll. 19-21, which discloses the use of the invention in “complex liquid streams” and references throughout the specification of the application to petroleum refining; for example, the discussion (at page 13, l. 13 – page 14, l. 20) of the Fluid Catalytic Cracking Unit in a petroleum refinery producing such products as gasoline, kerosene, diesel, aviation and bunker fuel. Claims 27 and 28 are also supported at page 13, l. 13 – page 15, l. 4.

The rejections and objections entered in the office action of June 6, 2004 are summarized below.

Outstanding Rejections/Objections

The Examiner has entered or maintained the following objections/rejections:

1. Claims 1, 5, 6, and 12 are rejected under 35 USC § 103(a), as being unpatentable over U.S. Patent 4,892,139 to LaHaye (“LaHaye ‘139”) in view of U.S. Patent 3,933,606 to Harms (“Harms ‘606”).
2. Claims 14 and 15 are rejected under 35 USC § 103(a) as being unpatentable over LaHaye ‘139 in view of U.S. Patent 6,451,210 to Sivavec (“Sivavec ‘210”).

Rejection of Claims 1, 5, 6, and 12 under 35 USC § 103(a)

The examiner has rejected claims 1, 5, 6, and 12 are rejected under 35 USC § 103(a), as being unpatentable over LaHaye '139 in view of Harms '606.

With the present amendments to the claims, Applicants believe that the basis for the Examiner's rejection has been removed and that the claims are in condition for allowance. The present amendments clarify the scope of the claims.

Neither LaHaye '139 nor Harms '606 teaches the application of an electric charge to a process component within the flow path of a liquid hydrocarbon stream to prevent fouling of the process component. LaHaye '139 discusses a heat exchanger fouling condition in a coal-fired utility boiler. Harms '606 discusses contaminated water treatment to separate trace amounts (ppm) of chromium, cadmium, zinc and free cyanide. The instant claims are directed to the prevention of fouling of components in liquid hydrocarbon streams, with one non-limiting example being the application to Clarified Oil Heat Exchangers associated with Fluid Catalytic Cracking Units located in the catalytic process area of oil refineries. LaHaye '139 is concerned with fouling from a particulate laden gas flow. Thus, LaHaye '139 is not directed to liquid flows but to gas flows, and in particular to non-flammable gas flows, specifically combustion gases. (See, e.g., LaHaye '139 at Abstract; at col. 1, ll. 7-17; at col. 2, ll. 26-33, and other parts of the LaHaye '139 specification). Harms '606 also fails to teach or suggest the application of an electric charge to a process component within the flow path of a liquid hydrocarbon stream to prevent fouling of the process component. Harms '606 discloses a process and apparatus for electrolytically removing suspended and dissolved impurities from contaminated water. (See Harms '606 Abstract; col. 1, ll. 5-7).

The differences between the streams of the cited references and the liquid hydrocarbon stream of the pending claims are significant. Most notable of these differences

are phase, compositional and flammability differences. A liquid hydrocarbon stream of the type typically found in refineries are complex mixtures containing numerous hydrocarbons of various molecular weights. Water is the primary constituent in industrial aqueous streams and has a relatively low molecular weight of 18. Water is relatively non-volatile compared to many hydrocarbons and unlike most hydrocarbons, has no flammability. There are other chemical and physical properties that differ. Water, being a polar molecule, is a conductor, while most hydrocarbons are poor conductors (i.e., an insulator). What may be successfully applied in an aqueous, gaseous, or similar stream is not necessarily applicable to a liquid hydrocarbon stream. Applicants assert that applying the teachings of either LaHaye '139 or Harms '606, taken alone or combined with one another, were insufficient to teach the claimed subject matter nor render it obvious. Neither of these references suggest application to liquid hydrocarbon streams. In light of the amendments to the claims and the arguments presented herein, Applicants believe that the pending claims are in condition for allowance and respectfully request that the Examiner withdraw the outstanding rejection of claims 1, 5, 6, and 12 under 35 USC § 103(a).

Rejection of Claims 14 and 15 under 35 USC § 103(a)

The examiner has rejected claims 14 and 15 under 35 USC § 103(a) as being unpatentable over LaHaye '139 in view of Sivavec '210. As argued above, applicants assert that LaHaye '139 is not an appropriate reference because it is concerned with the flow of particulate laden combustion gases. Thus, the problem addressed by LaHaye '139 is quite different from that of the instant claims.

Sivavec '210 also fails to teach or suggest the application of an electric charge to a process component within the flow path of a liquid hydrocarbon stream to prevent fouling of the process component. Sivavec '210 discloses a process and apparatus for electrolytically removing suspended and dissolved impurities from contaminated water. While Sivavec '210

volatile organic compounds (VOCs) in the fluid streams, it makes clear that these are contaminants (minor components) in vapor or aqueous streams. At col. 2, ll. 38-41, Sivavec '120 states:

Specific elements of the system include a sensing module to detect contaminants in a vapor or aqueous stream and to detect pressure build-up in a carbon bed. (emphasis added).

As discussed in the earlier rejection, the differences between the streams of the cited references and the liquid hydrocarbon stream of the pending claims are significant. Most notable of these differences are phase, compositional, volatility, and flammability differences. A liquid hydrocarbon stream of the type typically found in refineries are complex mixtures containing numerous hydrocarbons of various molecular weights. Water is the primary constituent in industrial aqueous streams and has a relatively low molecular weight of 18. Water is relatively non-volatile compared to many hydrocarbons and unlike most hydrocarbons, has no flammability. There are other chemical and physical properties that differ. Water, being a polar molecule, is a conductor, while most hydrocarbons are poor conductors (i.e., an insulator). Also, Clarified Slurry Oil is not a Volatile Organic Compound (VOC) even though it is a liquid hydrocarbon. What may be successfully applied in an aqueous, gaseous, or similar stream is not necessarily applicable to a liquid hydrocarbon stream. Applicants assert that applying the teachings of either LaHaye '139 or Sivavec '210 taken alone or combined with one another, were insufficient to teach the claimed subject matter nor render it obvious. Neither of these references suggest application to liquid hydrocarbon streams. In light of the amendments to the claims and the arguments presented herein, Applicants believe that the pending claims are in condition for allowance and respectfully request that the Examiner withdraw the outstanding rejection of claims 14 and 15 under 35 USC § 103(a).

d.) Conclusions


In light of the arguments and amendments presented herein, Applicants also assert that the pending claims are now in condition for allowance. Because the Examiner's rejections have been properly addressed, Applicants respectfully request withdrawal of the outstanding rejections. Accordingly, Applicants earnestly request allowance of the application. This is intended to be a complete response. Applicants are including a Request for Continued Examination as per 37 CFR 1.17(e) for a small entity [\$385.00]. If any issues remain outstanding, please contact the undersigned for resolution of the same.

Applicants understand that under 37 CFR 1.141, they are entitled to consideration of claims to additional species which are written in dependent form or which otherwise include all of the limitations of an allowed generic claim. Accordingly, Applicants believe that claims 2-4 7-11, 13, and 16-17 fall into this category. In the first office action, the Examiner imposed a species requirement and requested withdrawal from consideration of the non-elected species.

Applicants enclose a check in the amount of \$385.00 in payment of the filing fee for a Request for Continued Examination. Otherwise, Applicants believe that no other fees are due or associated with the filing of this document. However, if Applicants are in error, the Commissioner is hereby authorized to draw any additional fees associated with this filing from Deposit Account No. 06-2375, under Order No. P02104US0/10100157, from which the undersigned is authorized to draw.

Respectfully submitted,

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